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PHILOSOPHICAL CONSIDERATIONS

The Anthropocene: A challenge to humanism in bioethics?

L'anthropocène: un défi pour l'humanisme en bioéthique?

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Summary In response to anthropogenic climate change, bioethics scholars have advocated a return to its roots in Van Rensselaer Potter's vision of bioethics as a discipline integrating the humanities and the sciences to support ecology. These scholars have noted that the discipline of bioethics diverged from this vision, and today its focus is on human health. This paper's ultimate argument is that these scholars do not appreciate the radicalness of their proposal and its potential to disrupt the discipline. This paper's argument unfolds in four steps. In the first step, the paper describes the environmental impact of U.S. health care and claims that contemporary bioethics is unlikely to prioritize environmental protection over patients because of its humanistic character. To emphasize this character, this part of the paper identifies two forms of health care treatment that bioethics would not deny to patients despite their environmental costs. The second step of the paper is to review the scientific fact of man-made climate change and its inauguration of a new geological epoch, the Anthropocene. Then, the third step of this paper reflects on this fact's impact on the category of humanist understanding. The central idea in the third part of this paper is that the Anthropocene undermines the traditional dichotomy between man and nature, which is conceptually necessary for humanist philosophy. If the human is not a distinct category, then attributing preeminent value to humans is invalid, undermining the system of thought centered on humans. The final step in this paper argues that the consequence of reckoning with contemporary ecology is that it generates a demand for a new system of value—and Anthropocene ethics — that deprioritizes human good, and which would provide rebuttals to criticisms that such a system of values is misanthropic. An Anthropocene ethics may justify prioritizing environmental protection over patients' health needs.
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Résumé En réponse au changement climatique anthropique, les chercheurs en bioéthique ont plaidé pour un retour à ses racines, la vision de la bioéthique de Van Rensselaer Potter en tant que discipline intégrant les sciences humaines et les sciences pour soutenir l'écologie. Ces chercheurs ont remarqué que la bioéthique s'est éloignée de cette vision et qu'aujourd'hui, elle se concentre sur la santé humaine. Le but de cet article est de montrer que ces chercheurs ne se rendent pas compte de la radicalité de leur proposition et de son potentiel à perturber la discipline. Cet article se déroule en quatre étapes. Dans la première étape, le document décrit l'impact environnemental des soins de santé aux États-Unis et affirme que la bioéthique contemporaine a peu de chances de donner la priorité à la protection de l'environnement par rapport aux patients en raison de son caractère humaniste. Pour souligner ce caractère, cette partie de l'article identifie deux formes de traitement de santé que la bioéthique ne refuserait pas aux patients malgré leurs coûts environnementaux. La deuxième étape de l'article est d'examiner le fait scientifique du changement climatique d'origine humaine et son inauguration d'une nouvelle époque géologique, l'anthropocène. Ensuite, la troisième étape de cet article reflète l'impact de ce fait sur la catégorie de la compréhension humaniste. L'idée centrale dans la troisième partie de cet article est que l'anthropocène mine la dichotomie traditionnelle entre l'homme et la nature, conceptuellement nécessaire à la philosophie humaniste. Si l'humain n'est pas une catégorie distincte, attribuer une valeur prééminente aux hommes est alors invalide, sapant le système de pensée centré sur les hommes. La dernière étape de cet article soutient que la conséquence du calcul avec l'écologie contemporaine est qu'elle génère une demande pour un nouveau système de valeurs — et d'éthique anthropocène — qui prive le bien humain et qui réfuterait les critiques selon lesquelles un tel système de valeurs est misanthropique. Une éthique anthropocène pourrait justifier la priorisation de la protection de l'environnement au détriment besoins de santé des patients.
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Anthropogenic climate change (ACG) demands responses to mitigate its harms. Lisa Lee's ''A Bridge Back to the Future: Public Health Ethics, Bioethics, and Environmental Ethics'' proposes a response that seeks to reconnect the fields of environmental ethics with bioethics through the subfield of public health ethics [1]. Her article is the latest entry in a recurring cycle of pleas to reintegrate environmental ethics with bioethics within the bioethics literature [2—10].

Histories of bioethics describe the genesis of bioethics in the 1970s as a response to several events: revelation of physician misconduct; emerging biotechnology; overpopulation; ecological crisis [11—13]. Today, bioethics refers to an interdisciplinary field that investigates the ethical dimensions of, predominantly, clinical medical practice, extant and emerging biotechnology, and human subjects research. In contrast, environmental ethics, the philosophical examination of ''the moral relationship of human beings to, and the value and moral status of, the environment,'' diverged as a distinct discipline for scholars whose focus was ecology [13,14]. Lee and her predecessors lament this divergence and identify Van Rensselaer Potter's *Bioethics: Bridge to the Future* as an inspiration for how to situate environmental concern within bioethics [15]. In fact, Lee has contemporaries who share her esteem for Potter's *Bioethics* [16—19].

This contribution to these volumes on Controversies in Bioethics aims to identify a looming controversy for bioethics or, even, to ignite it. This paper's thesis is that pursuing the goal of reintegrating environmental ethics has the potential to radically disrupt the field by deprioritizing, or even eliminating, the humanistic character of bioethics.

Lee identifies the spread of mosquito-borne encephalitic diseases as an issue in which public health, bioethics, and environmental ethics overlap. Perspectives from public health ethics, bioethics, and environmental ethics should be applied to the proposal to combat these diseases through genetically engineering mosquitoes that do not carry disease [1, p. 9]. I do not disagree, but this neglects that it is ACG that has expanded the habitable areas of the plant for these mosquitoes. Lee's focus is on mitigating the effect of climate change, and not on mitigating climate change itself. Slowing climate change is urgent, and bioethics ought to address which steps to slow it are ethical. If bioethicists grasp the scale of ACG, they may begin to consider that biomedicine's response to the urgency of climate change includes options that are anti-humanist.

A 2016 study in *PLoS One* study found ''growth in U.S. health care GHG emissions, with an increase of more than 30% over the past decade to a total of 655 million metric tons carbon dioxide equivalents (Mt CO_2-e) in 2013, or 9.8% of the national total. If the U.S. health care sector were itself a country, it would rank 13th in the world for GHG emissions, ahead of the entire U.K.'' [74]. Power generation accounts for 36% of the U.S. health care sector's greenhouse gas (GHG) emissions [20]. In 2008, the U.K. Climate Change Act set a goal of reducing GHG emissions to 80% below 1990 levels by

2050 [21]. However, many climate scientists maintain that the U.K. must reduce emissions to net-zero by 2050, if the U.K. is to fulfill its part in meeting the goals of the Paris Agreement [22].

Since the late 1990s, Pierce and Jameton have advocated that the U.S. health care sector has a significant negative impact on the environment, both downstream — medical waste — and upstream from its reliance on a wide variety of natural resources — rare metals, petroleum, biomass, water — but a lack of data made it difficult to this assess impact [2]. The *PLoS One* study reveals that the impact is major [20]. The different sectors of the U.S. economy need to fill the leadership gap on reducing GHG emissions in the U.S. after the federal government's withdrawal from the Paris Agreement. To avert extreme climate change, the U.S. health care sector must find ways to become more sustainable because its impact on climate is greater than all but twelve of the world's countries.

The U.S. health care sector faces a major challenge if it were to adopt an ambitious aim of matching the U.K.'s efforts at fighting climate change because it could not expect federal regulations to ensure that its energy consumption is carbon neutral. In addition, because energy consumption only accounts for 36% of the U.S. health care sector's GHG emissions, it would have to identify other means of reducing its environmental impact. Pierce and Jameton stress the importance of balancing environmental protection with the immediate health needs of patients, while also acknowledging that tensions may exist between these two goods [2].

Two decades on from Pierce and Jameton's article, the urgency of ACG demands that bioethicists engage with these tensions. While the *PLoS One* study provides data on the health care sector's impact on the environment, it remains difficult to identify data on the effect of particular health care treatments. There are two health care treatments whose environmental consequences we can begin to understand: kidney dialysis and assisted reproduction.

Over 100,000 Americans are waiting to receive a kidney transplant [23]. This number grows every year. Nearly 500,000 Americans received dialysis in 2017 [24]. The availability of kidney dialysis to treat chronic kidney disease (CKD) is a significant factor in allowing people to delay the need for organ transplant and to endure the wait once listed for transplant. At the 2016 American Transplant Congress, Grafals and Sanchez presented their analysis of the environmental impact of kidney dialysis in a poster, ''The Environmental Impact of Dialysis vs Transplantation'' [25]. They found that transplant was 90.9% to 95.7% less environmentally intensive than dialysis. A patient undergoing weekly kidney dialysis uses 18,000 liters of water and 800—925 kilowatt hours of energy per year, and the 450,000 users of dialysis in the U.S. generate 7 billion pounds of carbon-based waste per year [25]. A pound of CO_2 is generated per kilowatt hour of energy, so the collective CO_2 emissions from dialysis is the equivalent of adding 40,500 passenger vehicles to the roads each year.

Assisted Reproductive Technology (ART) — hormone therapy, artificial insemination, and in vitro fertilization — are forms of health care that allow people facing infertility to reproduce. In 2013, the International Committee for Monitoring Assisted Reproductive Technology (ICMART) reported that nearly five million live births were attributed to ART [26]. Another study indicated a nearly 37% increase in ART cycles in the U.S. between 2006 and 2013 [27]. Wynes and Nichols found that the single greatest way to reduce one's environmental impact is to have one fewer child [28]. Having one fewer child would reduce a family's CO_2 emission by 58.6 metric tons per year [28]. Choosing to have one fewer child is 24 times more effective than discontinuing dialysis in resisting climate change.

It is unimaginable that contemporary bioethics could muster arguments that would justify denying patients either of these treatments. Within medical ethics, that it is ethical to offer dialysis to patients with CKD is unquestioned. Beneficence, one of Beauchamp and Childress' principles of biomedical ethics, dominates analysis of this medical intervention [29]. Beneficence supports the provision of dialysis to patients with CKD because dialysis can compensate for a temporary impairment of kidney function, which can be reversed, or replace kidney function for chronic kidney disease, providing benefits, like prolonged life, to patients. Bioethicists seldom invoke justice, another of Beauchamp and Childress' pillar principles of biomedical ethics, when analyzing the ethics of dialysis. If bioethicists do apply justice to the ethics of dialysis, it is in the context of either allocation of society's financial resources within national health care schemes or treatment for ICU patients who are terminally ill and occupying an ICU bed, a scarce hospital resource.

The dominant bioethical analysis of ART is through the lens of fertility control. Bioethicists interpret fertility control as a matter of reproductive autonomy. Women, and men, should be free to decide if and when to reproduce, and which measures, if any, to take to support these choices. ART is ethical because it supports reproductive autonomy. There are bioethicists who criticize ART, but they typically object that ART degrades human nature or destroys human embryos.

This kind of ethical analysis does not attempt to balance the good of environmental protection with the immediate health needs of patients. Environmental protection is either excluded or drastically discounted as a comparative good in comparison to humans' immediate health needs. The typical bioethical analyses of dialysis and ART reflect a perspective in which human concerns are the only factors that guide reflection. This analysis should not surprise us because bioethics is an essentially humanist discipline, as I will argue. A bioethics argument that ethically justifies denying these treatments to patients for the sake of environmental protection would mark such a radical rupture with the discipline's norms that bioethicists may find it unimaginable. The rest of this paper argues that AGC leaves bioethics poised for such a disruption, if environmental concerns are reintegrated into bioethics on Potterian lines as many bioethicists advocate.

Bioethics is at risk of a disruption because scholarship in the environmental humanities that unconsciously embodies Potter's vision endangers bioethics' humanist character. Potter envisions a new discipline of bioethics as an advancement of knowledge through the mutual

transformation of science and the humanities [15, p. vii]. And, he prescribes a methodology for doing bioethics rather than ethical principles. Scholars in the environmental humanities interpret the advent of the Anthropocene as complicating traditional intellectual categories within humanism. Bioethics' response to the Anthropocene has been sluggish, and despite its interdisciplinarity, the field has not taken notice of scholarship on this issue in the environmental humanities. Reintegration of environmental ethics with bioethics along Potterian lines should be approached cautiously because it will require engagement with the environmental humanities, and the implications of this may not be sufficiently appreciated for bioethics.

Some may doubt that bioethics has a humanist character that can be endangered. Characterizing ''humanism'' is a challenge because the term is associated with several historical intellectual movements (classical, Renaissance, and Enlightenment humanism) and different philosophical developments (pragmatism, Marxism, existentialism) [30]. One form of humanism has its roots in the Renaissance revival of the classical education — grammar, rhetoric, history, poetry, moral philosophy — in contrast to education that stressed theology, shifting the focus from the divine to the human. An emphasis on the rationality and freedom of humans characterizes Enlightenment humanism. Humans are special because they are rational, not because they are ''made in the image of God''. This rationality frees humans from dependence on divine authority for ordering human morality and social institutions, transforming them into autonomous agents [30].

Other philosophical movements reject the Enlightenment ideal that reason is the essence of humans but retain a focus on humans. Within Pragmatist ethics, what is moral is not arrived at through reason — it is a social phenomenon that is determined by what contributes to shared human aims [31]. The existentialist slogan of ''existence precedes essence'' embodies the rejection of a human essence but holds out human freedom to endow meaning as the source of value [30]. The Marxist critique of capitalism can be characterized as humanist because it emphasizes how capitalism alienates people from what makes them human, their productive capacity [30]. As is evident from these examples, it is not possible to establish a single account of humanism, but it is possible to identify some characteristics of the humanist perspective.

Humanism places humans at the center of the universe by emphasizing their experiences and perspectives and explaining other phenomena in those terms. It also elevates the human means of knowing — reason and science — over other sources of knowledge like revelation. Humanism also prioritizes human value and interests over other values and non-human interests. This humanist disposition is difficult to evade for two reasons. One is that crude humanism, as exemplified by the view that human beings are the summit of evolutionary development, is a common opinion, so we are steeped in it from birth. Second, humanism is the inheritance of the humanities, so most philosophers, bioethicists, historians, anthropologists, or literary scholars work within a humanist framework. Humanism involves the privileging of the human.

Is bioethics humanistic?[1] The consolidation of the fields of bioethics and environmental ethics is an important reason to believe it is. Historical accounts of the development of bioethics describe a process in which the field coalesced around ''dilemmas affecting human beings in medicalized settings'' as reflected in the work of the Kennedy Institute of Ethics [13, p. 2]. Other chronicles of bioethics' history emphasize the role of government commissions in the field's development [31]. The National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research and the resulting guidelines published in the *Belmont Report* focused on human centered research [31,32]. And, in the field's most influential text, *Principles of Biomedical Ethics*, the context for the principles is human experience [29]. Topics emphasizing human interests as related to biomedical practice and research dominate the major textbooks or anthologies of bioethics [33—35][2].

Van Rensselaer Potter's *Bioethics: Bridges to the Future*, the model for integrating ecological concern into bioethics scholarship, is also humanist. Potter's theory of bioethics constitutes a methodology more than analysis of issues or prescriptions, but he saw his version of bioethics as a means to preserve the human species by ensuring ''the survival of the total ecosystem'' [15, p. vii]. For this project to succeed, bioethics must link ethics, which is a province of the humanities, with biological facts, which are the provinces of the sciences. He explicitly states that what is demanded of bioethics is the connection of human ethics with a ''realistic understanding of ecology'' [15, p. vii].

Potter bioethics should not be conceived of as merely applying the insights of moral philosophers — Aristotle, or Aquinas, or Kant, or Mill — while more fully informed of the relevant scientific facts. Nor is it merely a call for more specific facts — it demands a synthesis: the historical insights of moral philosophers coupled with a more complete and sophisticated understanding of the facts should yield new bioethical principles. Potter's ideal is a field in which scholars actively interrogate how research in other disciplines affects knowledge within their own. While Potter contends that biological knowledge and human values are the two most important elements in developing bioethics, he is remarkably catholic about which disciplines can contribute. He includes the social sciences and humanities, in addition to the sciences [15, p. 1—2].

The most significant element of Potter's methodology is his insistence that science should also shape knowledge

[1] An impish answer would direct the reader to the other contributions to these volumes on Controversies in Bioethics — all of the other entries take up issues that are about humans.

[2] Commenters have raised the example of Peter Singer, famous for his work on animal ethics, to challenge this characterization of bioethics as humanistic. Singer is not a counter-example because, first, the claim is modest — humanism dominates bioethics. Second, Singer may be famous because he is the exception. Third, Singer's view that the inclusion of more beings into the circle of moral regard is what constitutes moral progress suggests a humanist inclination. Typical humans are the point from which the radius of that circle is defined, and the case for inclusion is a comparison to a typical human [36,37].

in the humanities. Potter contends that the political decisions about the earth's resources — obviously shirked — are dependent on assumptions about man's nature and place in the world, and this should not ignore the biological facts of human beings [15, p. 4].

Proponents of reintegrating environmental ethics with bioethics on Potterian lines have failed to appreciate the implications of this methodology for a bioethics that is interdisciplinary. Ecologically-minded bioethicists respond to ACG as a problem to be solved rather than a fact. They fail to consider how climate change's facticity is new scientific knowledge, upon which the discipline must reflect for its implications for knowledge in the humanities. This is important because other humanities disciplines have assessed how the fact of ACG may transform humanistic understanding. Because Potterian bioethics and contemporary bioethics are interdisciplinary, it is probable that theses from the humanities will exert some influence on debate within the field.

Understanding how the environmental humanities embody Potterian bioethics is not possible without appreciating the significance of the fact of ACG. First of all, scientific consensus supports that ACG is a fact. Ninety-seven percent of scientists endorse the hypothesis that climate change is due to human behavior. The best meta-analyses of this consensus are John Cook and colleagues' reviews [38,39]. In 2013, Cook et al. reported:

Among abstracts that expressed a position on AGW, 97.1% endorsed the scientific consensus. Among scientists who expressed a position on AGW in their abstract, 98.4% endorsed the consensus [38, p. 3].

In 2016, their research revealed: the number of papers rejecting Anthropogenic, or human-caused, Global Warming [AGW] is a miniscule proportion of the published research, with the percentage slightly decreasing over time. Among papers expressing a position on AGW, an overwhelming percentage (97.2% based on self-ratings, 97.1% based on abstract ratings) endorses the scientific consensus on AGW [39, p. 6].

The effects of climate change are familiar. Increased frequency of intense weather phenomena — heat waves, cold snaps, drought, extreme precipitation — is likely due to climate change. Global warming, however, is the most prominent way to describe climate change. According to NASA's Goddard Institute for Space Studies, the average global temperature of the Earth has increased by .8 degrees Celsius since 1880, and two-thirds of that warming has occurred since 1975 [40]. This may not seem like a major shift, but in the past, a one- or two-degree decrease was sufficient to trigger a little ice age [41].

Besides rising global temperature, other measurements reflect global climate change. The Earth's oceans absorb much of the heat from this increase in temperature, and Levitus et al. report that the temperature of the oceans has increased .302 degrees Fahrenheit since 1969 [42]. It is counterintuitive, but sea levels rise as global temperature rises because even though more water evaporates into the atmosphere warmer water expands. Global sea levels rose eight inches in the last century and half of that occurred in the past two decades [43]. The Union of Concerned Scientists reports that sea levels are projected to rise six to sixteen inches by 2050, and one to four feet by 2100 [44]. Warming water is not the only cause of rising seas — ice sheets melting from increased temperature also contribute [44]. The Antarctic ice sheet, for example, has lost over 1900 gigatonnes of its mass since 2002, and more than half of that has occurred since the end of 2009 [45].

These numbers represent an unprecedented scale and rate of climate change compared to the Earth's historical climate change. Rising concentration of gases like water vapor, carbon dioxide (CO_2), methane, and nitrous oxide in the atmosphere is the principle cause of global climate change. Increasing concentration of gases in the atmosphere prevents heat from radiating into space off the Earth's surface. The concentration of CO_2 exacerbates this process. The human contribution to the rise in CO_2 concentration in the atmosphere through deforestation and burning fossil fuel is one of the principle causes of climate change.

CO_2 concentration on March 20, 2018 was 409 parts per million (ppm) of the atmosphere, and it was 314 ppm when first measured at the Mauna Loa Observatory in 1958 [46]. Measurements of CO_2 concentration in bubbles of air trapped inside Antarctic ice indicate that the pre-industrial CO_2 concentration was 280 ppm [47,48]. Because the ice can be dated, we can compare the current CO_2 concentration in the atmosphere to the concentration in the atmosphere millennia ago — the ice dates to eight hundred thousand years ago, and at no point in that time had CO_2 levels in the atmosphere exceeded 300 ppm [47,48]. The Keeling Curve, which visualizes the trend in CO_2 concentration, predicts that it will reach 450 ppm by 2035, and 500 ppm by 2065, if CO_2 continues to rise at current rates [49].

Even when climate change is quantified, it is challenging to appreciate because the numbers seem small — 409 ppm, .302 degrees Celsius, 1-foot increase in sea levels. The most shocking number is that CO_2 concentration has not been this high in eight hundred thousand years. In *The Birth of the Anthropocene*, Jeremy Davies argues that it only possible to understand climate change by comparing the earth's climate in the present and near future to previous geological epochs, which is reflected in the adoption of the term *Anthropocene* [50, p. 2]. Davies credits Paul Crutzen, a Nobel Prize winning atmospheric chemist, and ecologist Eugene Stoermer with popularizing the term [50, p. 43].

Crutzen and Stoermer sought to draw a distinction between the Holocene — the geological epoch that began nearly twelve thousand years ago and provided the environmental conditions for human civilization to flourish — and the current milieu in which human action would ''remain a major geological force for many millennia, maybe millions of years to come'' [51, p. 18]. Crutzen and Stoermer date the Anthropocene to the late eighteenth century because ''[t]his is the period when data retrieved from glacial ice cores show the beginning of a growth in the atmospheric concentrations of several 'greenhouse gases', in particular CO_2 and CH_4,'' which coincides with the invention of the steam engine [51, p. 17–18]. At the 35th International Geological Congress in 2016, the Working Group on the Anthropocene recommended that the Anthropocene be added to the Geological Time Scale and published their conclusions in *Anthropocene* the next year [52].

That climate change constitutes a human effect on the geological record is startling, and failure to comprehend this limits appreciation of the fact of ACG. One way to grasp this shift is to juxtapose the duration of the Holocene epoch

and its termination in the advent of the Anthropocene with other epochs in recent geological history. The geological time scale is divided, by descending magnitude, into eons, eras, periods, epochs, and ages. The current era, the Cenozoic, which began sixty-six million years ago when dinosaurs went extinct, is subdivided into three geological periods — the Paleogene, the Neogene, and the Quaternary, the current period, which began two million-six hundred thousand years ago. If the Anthropocene is included as a geological epoch, the Holocene is the shortest of the Cenozoic era by a factor of twenty, lasting only eleven thousand-seven hundred years. By comparison, the Pliocene epoch in the Neogene period is the second shortest epoch, lasting for one million-seven hundred thousand years. The Anthropocene is as much about the termination of the Holocene as its own advent: human action brought a geological epoch to close in much less time than other geological forces have in history.

How are the humanities to respond to these facts about ACG? For some political scientists, climate change demands a political solution through coordinated, collective action [53]. Ethicists may interpret ACG as presenting the question of how an individual should behave in light of it: for example, may I go on eating meat [54]? In these examples, the ideas and methods of humanities disciplines are applied to facts about climate change, but they remain independent of these facts.

Many scholars do not interpret ACG as a reason to reevaluate the ideas or methods that constitute their disciplines. A literature search indicates that there is little scholarship on how ACG challenges us to reconsider the philosophical assumptions that inform bioethics and philosophical ethics. Bioethicists have not taken up the project of considering how ACG complicates central assumptions about humanity within their scholarly tradition with the same haste as the other humanities[3]. This is so in spite of the fact that bioethics has aligned itself with the humanities through the consolidation of American Association for Bioethics, the Society for Bioethics Consultants, and the Society for Health and Human Values into the American Society for Bioethics + Humanities (ASBH) [59].

A tension between bioethics and humanities some scholars identify may be the cause of this neglect [60,61]. Levine attributes the tension to the contrast between ethicists' desire for clear and objective normative statements and the ambiguity other humanities tolerate [61, p. 18]. A similar tension exists within philosophy between the analytic and continental traditions. Bioethicist-philosophers trained in the analytic tradition may be skeptical of this research project in the humanities because of disciplinary insularity. This scholarship is not conservative. In an introductory article to a special issue of the *South Atlantic Quarterly* on ACG and knowledge production, Ian Baucom and Matthew Omelsky contend that one of its major challenges is how it ''affects how we think'' by reshaping ''the contemporary architecture of knowledge itself'' and ''reconstituting intellectual disciplines... [and] redrawing and dissolving boundaries'' [62, p. 1—2]. In one way, this essay sounds the alarm that if bioethicist-philosophers neglect this scholarship, they may find it transforming bioethics through interdisciplinary cross-pollination.

In *Against Purity: Living Ethically in Compromised Times*, Alexis Shotwell describes the Anthropocene as ''the moment that humans worry that we have lost a natural state of purity or decide that purity is something we ought to pursue or defend'' [63, p. 1—2]. For Shotwell, the advent of the Anthropocene is not just an appreciation of the earth's deracination; it is the innocence shattering recognition of our complicity in that transformation. A hallmark of Anthropocene scholarship has been to understand how our role in climate change may challenge the purity of the concepts of ''human'' and ''nature''.

Donna Harraway has linked her post-humanist project of rejecting dualisms like human-animal or human-nature with the Anthropocene. In *Staying with the Trouble: Making Kin in the Chthulucene*, Harraway argues that the response to ACG should be making kin with all the parts of the earth through recognizing that humans and non-human others are interdependently transforming in a way that undermines individualism [64][4]. In ''Agency at the time of the Anthropocene'', Bruno Latour argues that the Anthropocene undermines the objectivity at the heart of science [65]. ACG subverts the distance between subject and object, which constitutes, in part, science's objectivity, because humans are part of the phenomenon being studied [65, p. 2]. More radically, Latour suggests that the distinction between subject and object is meaningless in the Anthropocene. In order, to be an object of study, something has to be something fixed or stable to situate the subject's perspective. However, with climate science, nature cannot be an object because humans are transforming it, and as a consequence, humans' status as a subject is also unsettled.

Dipesh Chakrabarty's article, ''The Climate of History: Four Theses'', is a seminal work for thinking through how the Anthropocene complicates traditional concepts in the humanities [66]. It has been cited more than one thousand two hundred times. Chakrabarty notes that the Giambattista Vico encouraged historians to distinguish human history from natural history [66, p. 201]. The former is knowable because humans create it, while the latter is unknowable because humans cannot create nature. R.G. Collingwood extended this insight by arguing that nature, unlike humans, has no ''inside'' and, consequently, the events of nature are mere events. In contrast human events are actions, committed

[3] There are some outliers. Brian Henning has argued that challenge of global climate change is to subsume human value within the community of all intrinsically valuable beings [55]. Donald Maier has pressed the claim that the Anthropocene demands a reappraisal of the value of nature [56]. Dale Jamieson, who has written about animal and environmental ethics over a long career, has argued that climate change generates a need to revise the moral concept of responsibility [57]. Bruce Jennings has observed that climate change requires a reconceptualization of values, and so bioethics must recast the ''right relationship'' between humans and nature, shifting it from exploitation to inhabitation [58, pp. 23—24]. These philosophers have responded to knowledge in the sciences to reflect on its implication for concepts within ethics, but they are exceptions to the rule that bioethics and philosophical ethics have not seen climate change as a challenge to traditional philosophical concepts.

[4] ''Chthulucene'' is Harraway's alternative to ''Anthropocene'', which she rejects as incompatible with her rejection of individualism.

by agents, and history attempts to understand the agents' interior reasons for action [66, p. 202]. Other accounts of history argued that human and natural history are divorced because alterations between humans' relationship to the environment were so slow that they were ahistorical [66, p. 205]. The first of Chakrabarty's theses is that climate science's identification of the Anthropocene collapses ''the age-old humanist distinction between natural history and human history'' [66, p. 201]. This is because humans are no longer simple agents; instead, they are a geological force, ''a force of nature'' [66, p. 206—207].

Chakrabarty' analysis suggests that humans have become a part of nature, and he contrasts his position with Bill McKibben's argument in *The End of Nature* that global warming represents the end of nature as an independent force [66, p. 207, 58]. For McKibben, what's left after global warming is human force, and nature is no longer ''a separate realm that had always served to make us feel smaller'' [67,p. xxii, in 57, p. 207]. This suggests that Chakrabarty interprets ACG as dissolving more than a disciplinary distinction; it dissolves the distinction between humans and nature. This is a metaphysical thesis that Timothy J. LeCain characterizes as the ''Great Ontological Collapse'' [68, p. 16].

LeCain notes that Chakrabarty's deflation of the human-natural distinction pops the human ontological bubble of being on a separate plane from the material world [68, p. 16]. LeCain argues, echoing Latour, that the grounds for this distinction had been humans' nature as subjects, and not objects [68, p. 16]. LeCain also interprets this deflation as support for the view that the natural world causally acts on the human intellect, a form of entanglement that suggests an affinity to Harraway's vision of human and non-human interdependent becoming. An important implication of LeCain's analysis is that the Anthropocene is an impetus for humanities scholars to engage in ontological flattening.

The ontological flattening thesis does not assimilate the non-human to the human, rather it suggests that there is little, if anything, to distinguish the human from the non-human. This challenges the humanist assumption that humans are a thing apart from the rest of the world, and it undermines the pre-eminence of the human perceptive, which is central to the humanist project.

Some humanities scholars seize on these implications to declare the humanist intellectual heritage is obsolete. In the introduction to their volume, Clive Hamilton, François Gemmenne, and Christophe Bonneuil argue that the dualism between the human and natural on which sociology, history, economics, and philosophy depend is difficult to defend [69, p. 5]. We must rethink concepts, like autonomy, agency, and freedom, that are defined for a pure, individual human should be questioned, and the idea of the human, the social contract, politics, and ''conventional'' ethics, universal maxims and consequentialist thinking alike [69, p. 5,8].

Some bioethicist-philosophers may believe some normative ethical theories are immune to this demand for revision because they need not embody humanist chauvinism. Natural law theories, like Aquinas', Kantianism, and contractualism all *prima facie* privilege human capacities, but because virtue ethics and consequentialism do not, they may be a refuge for bioethicist-philosophers. Hamilton, Bonneuil, and Gemenne, and others sympathetic to their project, are likely to argue that the teleology at the heart of virtue ethics depends on individuating humans as distinct things, which is no longer possible given the Anthropocene. Consequentialism, with its emphasis on pleasure and pain as loci of utility, has often licensed the incorporation of non-human organisms into the moral calculus, may be the normative ethical theory most immune from these scholars' critiques. However, some forms of consequentialism may be criticized if the values they aim to optimize are aligned to human interests.

To argue that we should be optimistic about the resiliency of the humanistic intellectual heritage against the Anthropocene or that traditional normative theories can be sustained in its wake is beyond the scope of this paper. Neither Chakrabarty nor Latour nor Harraway suggest that they conceive of themselves as bioethicists, but their work fits Potter's vision of bioethics' methodology. Few, if any, bioethicist-philosophers are similarly engaged with the Anthropocene in this Potterian mode[5]. Failing to reflect on the Anthropocene's implications for metaphysical and ethical categories, they are ceding ground to other humanities scholars and risking that Anthropocene humanities scholarship will fundamentally transform bioethics.

The alarmism is intentional.

If the Anthropocene undermines the philosophical foundations of historical normative theories, we will need an alternative — an Anthropocene ethics. Research into an Anthropocene ethics is nascent, but the notion of ''entanglement'' is central to this work [71—73]. This suggests that the holist ethics in environmental ethics may be a model for anticipating the direction Anthropocene ethics will take. Holist environmental ethics aim at avoiding the anthropocentrism of traditional ethics.

Leopold's *A Sand County Almanac* is one of the earliest pleas for a non-anthropocentric ethics [74]. Leopold proposed a land ethic, summarized in the principle, ''A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise'' [74, p. 224—225]. Leopold's land ethics is a holistic ethic because Leopold viewed the land, a whole, total ecosystem, as the object of moral concern.

J. Baird Callicott is the principle exponent of Leopold's land ethic. Callicott argues that all value, instrumental or intrinsic, originates in valuers. Callicott interprets Leopold's demonstration of the interrelations of the elements of ecosystems to establish that all of its elements are fellow citizens of a biotic community. And, because humans have traditionally attributed intrinsic value to fellow citizens of the human community, if they appreciate that they are citizens of a biotic community, they will intrinsically value all elements of that biotic community [75]. Once humans recognize that the good of its members depends on the integrity of the biotic community as a whole, they will value the biotic community intrinsically. This valuation underlies Leopold's principle [75]. As an example of the land ethic, Callicott has claimed that it is ethically permissible or obligatory to

[5] It is not unprecedented for bioethicist-philosophers to engage Potterian bioethics. *The Human Microbiome: Ethical, Legal, and Social Concerns* discussed how the science of the bacteria that colonize the human body complicated traditional philosophical conceptions of personal identity and property [70].

cull the deer population to protect the local environment from the negative effects of an increase in deer population [76]. While deer are citizens of the biotic community, other members may sacrifice them for the biotic community's preservation.

There are two major criticisms of the land ethic. The first is that it embodies an ecological form of fascism because it sublimates the good of the individual to the good of the community [77]. The second criticism is that consistency demands that it would be ethical to cull the human population if its increase was a threat to the biotic community [77]. The misanthropy of this implication is taken to be a *reductio* of the theory [14]. Anthropocene humanities scholarship provides proponents of a holist ethics with the resources to answer these charges[6].

First, consider the charge that a holist land ethic must be false because it is misanthropic. Misanthropy is dislike or antipathy for human beings. It is not obvious that the land ethics embodies an antipathy for human beings, rather it rejects a preference for human beings over other organisms. That the charge of misanthropy is a *reductio* — if the land ethic is true, then it follows that it is ethically permissible to treat humans in ways that are not ethically permissible, so it is false — indicates that the misanthropy lies in the failure to endorse a special value for humans.

Proponents of the land ethic can leverage the environmental humanities' rejection of human-nature dualism to respond. First, they can claim that if the human is not a distinct category from nature, then there is nothing that can bear this special value, and the criticism is confused from the start. Second, they can argue that an ethics that rejects the core assumptions of humanism will appear misanthropic to those who embrace humanism precisely because it rejects humanism. If you reject humanism's prioritization of human value, then the charge of misanthropy does not have any bite, and opponents of holism must offer a justification for their prioritization of human value.

Yeuk-Sze Lo notes that Tom Regan has charged the land ethic with fascism because he does not ''see how the notion of individual rights can find a home within ... [this] view'' [78, p. 361—362]. The charge of fascism originates in the failure of holist land ethics to ensure the protection of the individual from the common good. The primary response to this criticism is similar to the second response to the charge of misanthropy: the moral concept of individual rights to which Regan appeals is a feature of humanism, and a theory that is not humanistic cannot be expected to respect its moral concepts or priorities.

An Anthropocene ethics does not need to adopt Leopold's holist land ethic whole cloth, but it is likely to mirror the latter's emphasis on how all elements in an ecosystem are enmeshed and the well-being of the ecosystem. Prioritizing human good over environmental well-being would be an exception to the expected moral order. Pierce and Jameton have called for a balance between environmental protection and patients' health needs, but the dominant ethical perspective tilts the scale in the direction of patients' health needs. An Anthropocene ethics that rejects humans' moral preeminence would upend that status quo and provide support for denying patients' health care needs for environmental benefit[7].

Bioethics should respond to ACG, but it should be cautious about the push to incorporate environmental concern by returning to its Potterian roots. Scholars in the ecological humanities, reflecting on the significance of the Anthropocene, have been doing Potterian bioethics for a decade now. Because bioethics is now a truly interdisciplinary field, bioethicist-philosophers will have to reckon with this scholarship. To preserve bioethics' humanist character, bioethicist-philosophers will need to defend humanism. Bioethicist-philosophers sympathetic to the environmental humanities scholarship will need to participate in the project of developing an Anthropocene ethics. Failing that, bioethicist-philosophers will have to argue that Potterian bioethics' methodology is not relevant to bioethical problems. If they ignore Anthropocene humanities scholarship, they face a take-over of bioethics by environmental ethics.

Disclosure of interest

The author declares that he has no competing interest.

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[6] Lo acknowledges that Callicott tried to address the misanthropy charge by incorporating principles permitting the prioritization of obligations arising from membership in other communities over the biotic community but faults him for failing to justify why these principles supersede the land ethics' original principle [68].

[7] The prioritization of environmental well-being does not necessarily require that patients' health needs go unmet. For example, mandating posthumous organ donation can mitigate the human costs of discontinuing dialysis for CKD. Anthropocene ethics' effect on bioethics may be that it demands bioethicists to engage in finer comparisons of human goods.

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